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ABSTRACT

This lesson, which is part of a high school course in auto body repair and painting, deals with selecting a reducer when doing overall paint jobs using enamel paints. Students are taught the general properties of different types of enamel paints and selection of the proper reducer for each type of paint, depending on the weather and the specific job. The following materials are included: a lesson plan, transparency masters, and an exam. The lesson plan includes lists of references, student equipment and required dress, equipment and audiovisual aids required, objectives, special remarks, and an instructional outline that is cross-referenced with methods of instruction and aids. (MN)

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REDUCER SELECTION WHEN DOING OVERALL PAINT JOBS USING ENAMEL PAINTS

LESSON PLAN NO. 2

Layton M. Tyau

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LESSON PLAN

LESSON PLAN NO. 2	NAME: Fertado Memorial High School	PAGE 1 OF 8 PAGES

COURSE OF INSTRUCTION AND COURSE NUMBER:	TOTAL HOURS:	LESSON TITLE:
Autobody Repair and Painting VI65	10 hours	Reducer selection when doing over-all paint jobs using enamel paints.

DAY AND DATE OF INSTRUCTION:	HOURS	PLACE:
Thursday, November 22, 1988	50 min.	Building I

NO. OF STUDENTS:	REHEARSAL:	INSTRUCTOR AND ASSISTANTS:	STUDENT MATERIAL AND DRESS:
20		Layton M. Tyau	pencil & paper

REFERENCES:

1. Autobody Repair Lester G. Duenk, W. Randolph Williams, & Clarence A. Brooks. Peoria, Illinois. Chas. A. Bennet Co., Inc., 1977.
2. Supervised Study Manual for Automotive Refinishing. Instructional Materials Services. Div. of Extension. The University of Texas at Auburn. Austin, Texas. 1968, 71, 73.
3. Vocation Trade & Industry Education. "Autobody Refinisher". VanWinkle, James. Walker, Susan S. Curriculum and Insructional Material Center for Oklahoma State Board of Vocational & Technical Education 1986

EQUIPMENT AND AUDIO-VISUAL AIDS:

1. chalkboard/chalk
2. over-head projector/screen
3. enamel paint
4. reducer
5. clear glasses/cups
6. transparencies/pointer
7. painted samples
8. rags
9. outline worksheet
10. stirring stick
11. golf ball and/or orange peel
12. reducer gallon can
13. paint in can

OBJECTIVES:

1. Students will state in writ ing 3 types of enamal paints and the general properties of each.
2. Students will be able to select the proper reducer in accordance to the weather and job.
3. By completing the handout distributed, the student will correctly spell 5 terms used in reducer selection.

SPECIAL REMARKS:

Students have completed basic Automechanics. They are 2nd year students who have just spent the last 3 months learning autobody sanding and filling.

PRESENTATION

OUTLINE OF INSTRUCTION	TIME	METHODS OF INSTRUCTION AND AIDS
1. Introduction For the past month and a half we have been covering sanding and filling autobody. Now that you know how to get a car smooth and straight, it's time to put the icing on the cake---the paint job. But first you must learn some of the basics of painting. One important step in creating a beautiful paint job, when using enamel based paints, is proper reducer selection. So today we will discuss enamel paints and reducers. Take a look at the two samples. Which one would you rather have on your car? These finishes are examples of how critical reducer selection is.	3 min.	Samples of properly and improperly painted panels.
2. Standards & Objectives I will expect you to complete an outline which will be given to you at the beginning of the lecture. With this outline, you are to answer questions that will be asked throughout the lecture regarding enamel paints and reducers.	2 min.	Distribute outline to students.
3. Reasons You might be wondering why learn this, well aside from your own personal gains, like for instance painting your car or maybe your girlfriends car to score points, you want to learn about reducer selection to save you valuable money and time.	5 min.	

PRESENTATION

OUTLINE OF INSTRUCTION	TIME	METHODS OF INSTRUCTION AND AIDS
I. Enamel Paints A. 3 Basic Types 1. Alkyd Enamel 2. Acrylic Enamel 3. Polyurethane Enamel	2 min.	Show students cylindrical cans that the paints come in.
B. Alkyd Enamel 1. General---Has been in use for the past 30 years. 2. Cost---Older type, it is inexpensive, approximately $$$ for a gallon of ? 3. Drying Process---Relatively slow drying. Dries on an evaporation only process. 4. Finish---Not very glossy. 5. Use---Today, because of its low cost, it is mostly used for fleet painting. For example, trucks, vans, busses or anything that needs a paint job where the finish is not critical.		
C. Acrylic Enamel 1. General---Came into the market in the mid 70's. 2. Cost---Average cost. approximately $$$ for a gallon of ? 3. Drying Process---Dries rapidly because a catalyst hardener is used in conjunction with the paint. Approximately 6 hours to cure/dry. 4. Finish---Glossy hard finish that is fairly durable. 5. Use---Very popular, used in most shops because of its affordable price, glossy finish, and relatively fast "ready" time.	3 min.	
	5 min.	

PRESENTATION

OUTLINE OF INSTRUCTION	TIME	METHODS OF INSTRUCTION AND AIDS
). Polyurethane Enamel 1. General---Newest member to the enamel family. 2. Cost---Expensive. Because it uses a number of various chemicals to produce it. Thus the term "poly" is used. 3. Drying Process---Like the acrylic enamel the drying process is relatively fast. For drying it uses catalyst or hardeners. 4. Finish---Very glossy. The "wet look". very durable and strong. Resistant to the elements (sun, wind, rain). 5. Use---For people or businesses who want the best. Nice cars that need a beautiful as well as durable finish. Planes use it. Also may be a good choice for people who neglect polishing their car.	10 min.	Lecture
UESTIONS? Ask students if they have any questions or ask them questions. e.g: 1. What kind of enamel paint would you suggest to a customer who wants a very durable, glossy finish no matter how much it cost? Answer: Polyurethane Enamel 2. What kind of paint would you suggest to your cheap uncle who doesn't care what the finish looks like as long as there's color and it's cheap? Answer: Alkyd Enamel 3. What are some advantages of using Acrylic Enamel? --Average cost --Dries rapidly ---Glossy, hard finish	10 min.	

PRESENTATION

OUTLINE OF INSTRUCTION	TIME	METHODS OF INSTRUCTION AND AIDS
However, these paints do not come from the store ready to paint. They must first be thinned or reduced. Which brings us to our main topic, Enamel Reducers.	5 min.	Demonstration: In a clear glass, mix some paint and reducer together to show what the reducer does.
I. Enamel Reducers		
A. 3 Basic Types		Show student the containers they come in.
1. Cold Weather or fast reducer 2. Warm Weather or slow reducer 3. Hot Weather or very slow reducer	2 min.	Write on chalkboard or tranparency; Reducers 1.cold weather/fast 2.warm weather/medium 3.hot weather/slow
B. Cold Weather Reducer---for approx. 55-85°F.		
1. Popular brand name cold weather reducers		
a. ACME 887 50-70° F. b. Centari (DuPont) 8022S 55-70° F. c. Ditzler DTR-601 50-85° F. d. Martin Senour 8831 Fast e. R-M ER59 Fast	3 min.	
2. This reducer is used when temperatures are cooler, for instance,		
a. Night time. You may be spraying at night because the car might have taken you all day to prepare and the customer wants it tomorrow. b. Mornings c. Cold areas. Higher altitudes or ?		
3. Characteristics---Dries Fast		
a. Good points (if used appropriately) --Prevents runs or sags when painting in cold weather. --Cost. Cheapest of the three types. This fact makes cold weather reducer a good choice if you need to just clean your gun or general use.	10 min.	Sample of run or sag.

PRESENTATION

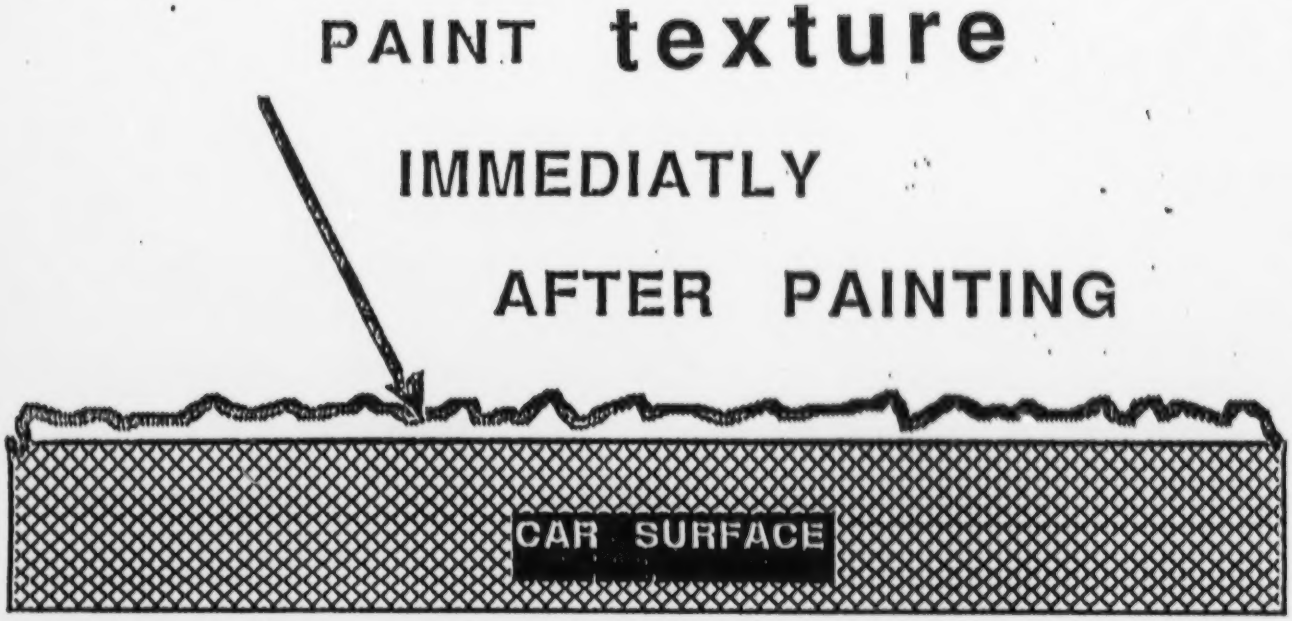
OUTLINE OF INSTRUCTION	TIME	METHODS OF INSTRUCTION AND AIDS
b. Bad points (if used inappropriately) --Will cause a non-glossy finish known as "Dry Spray" if used in too warm temperatures.	2 min.	Sample of "dry spray" to be shown here.
	5 min.	Transparency: paint texture immediatly after painting 1 Be sure to point out the rough surface texture.
4. Spot repairs a. Can be used for spot repairs because it will allow the paint to dry faster. Also the non-glossy finish is some-what desirable in spot repairs.		
QUESTIONS? Ask students if they have any questions. If none, ask them.		
1. When does dry-spray occur? Answer: when a reducer is used in too hot conditions.	3 min.	
2. Why is this reducer a good choice to use if you are going to clean your gun? Answer: Because it's cheaper than the other reducers.		
C. Warm or Normal Weather Reducer. Approx. 75-95° degree F.		
1. Popular brand name warm weather reducers		
a. ACME 888 70-85° F. b. Centari (DuPont) 8093S 70-90° F. c. Ditzler DTR-602 70-95° F. d. Martin Senour 8832 slow e. R-M ER60 medium		
2. This reducer is used when temperatures are warmer. For instance;	10 min.	
a. Mid-mornings b. Afternoons c. Humid days		

PRESENTATION

OUTLINE OF INSTRUCTION	TIME	METHODS OF INSTRUCTION AND AIDS
3. Characteristics---Dries slow		
a. Good points (if used appropriately) --Will allow paint to "Flow-Out" instead of dry spraying in warm weather Define Flow-out: Self leveling process of new paint.	3 min.	Transparency: flow out stages 2 paint texture after flow out 3
b. Bad points (if used inappropriately) --Because of its slower drying, it can cause runs if used in too cold weather. --Orange Peel can occur. Orange peel is when the paint does not complete its flow-out process. Instead the paint flows-out only partially then sets up or hardens. This will cause the paint surface to resemble the skin of an orange or even a golf ball.	2 min.	Transparency: flow out stages With grease pencil, circle stage 3. Emphasize that the paint gets to flow only to stage 3 then sets up.
D. Hot Weather/slow Reducer. Approx. 85-100° F.		
1. Popular brand name hot weather reducers		
a. ACME 841 85-100° F. b. Centari (DuPont) 8096S over 90° F. c. Ditzler DTR 604 85-100° F. d. Martin Senour 8833 very slow e. R-M ER61 very slow		
2. This reducer is used when temperatures are rather hot. This reducer is very popular in the tropical climates where temperatures in the 90's are not uncommon. Also the surface to be painted may be hotter than the air temperature so this reducer may not necessarily be used on "hot" days. For instance, the day you are spraying may be relatively cool but the surface you are spraying may be hot from being exposed to the sun or the engine.	5 min.	

PRESENTATION

OUTLINE OF INSTRUCTION	TIME	METHODS OF INSTRUCTION AND AIDS
3. Characteristics---very slow drying a. Good points (if used appropriately) --Will allow good flow-out even in hot weather. --Will also prevent dry spray on hot days. b. Bad points (if used inappropriately) --Can cause runs or sags --Can cause metallic sags. This is when the metallic chips in the paint fall or lay unevenly. Can be caused by too slow reducer selection and thus too slow paint set up. Instead of the paint setting up and holding the metallic chips in place, the excessively slow drying process allows the chips to fall. --Can cause "Solvent Popping". This is when fumes or vapors from previous coats try to escape through successive coats of paint.	3 min. 2 min.	Transparency: metalic chips suspended in paint. **4** Transparency: solvent popping **5** Identify the two layers of paint and the area where the paint is lifting.
SUMMARY The information just given to you should help you in creating flawless paint jobs. However, painting style and technique plays a very large factor in beautiful finishes. If one does not master the basics in spray gun use, there is no way that he/she will ever produce exceptional work. Hopefully the information given will at least give you a starting point. From there, it's all up to you. As they say, practice makes perfect.	5 min.	



[cross-sectional view]

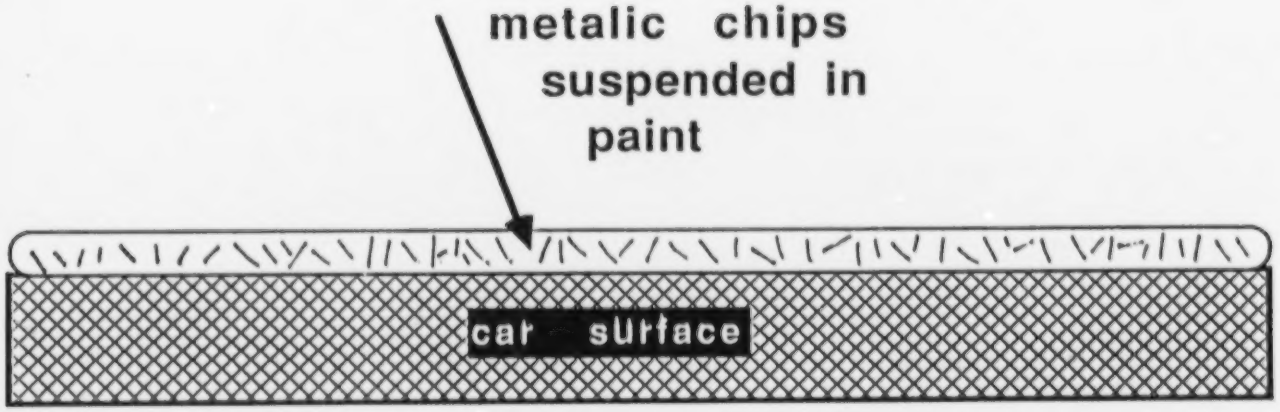
stages of "Flow-out"

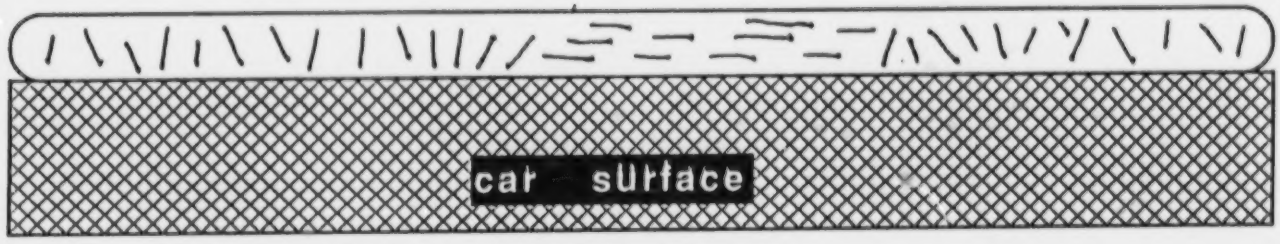
1 2 3 4

[cross-sectional view]

[cross-sectional view]

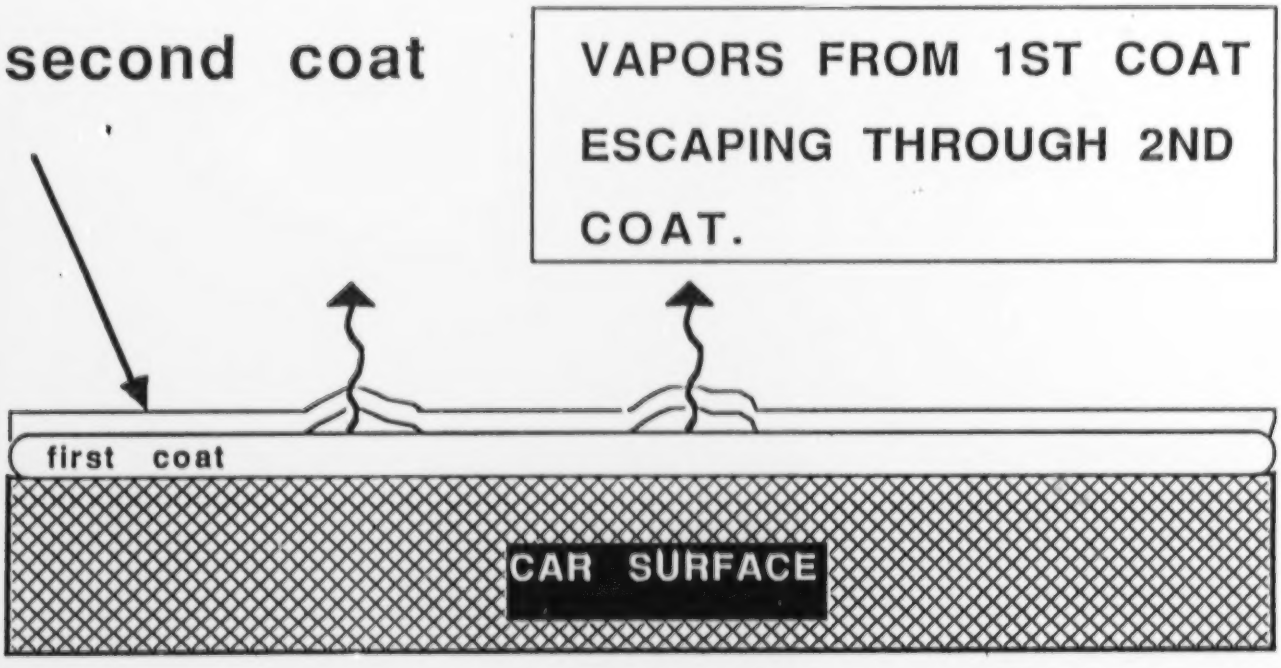
3





[cross-sectional views]

"Solvent Popping"



[cross-sectional view]

NAME_____

DATE_____PERIOD_____

Enamel Paints & Reducer Selection

I. Enamel Paints

A. 3 basic types

1._____
2._____
3._____

B. Alkyd Enamel

1. General-_____
_____
2. Cost-_____
3. Drying Time-_____
4. Finish-_____
5. Use-_____
_____
_____

C. Acrylic Enamel

1. General-_____
_____
2. Cost-_____
3. Drying Time-_____
4. Finish-_____
5. Use-_____
_____
_____

D. Polyurethane Enamel

1. General-_____
_____
2. Cost-_____
3. Drying Time-_____
4. Finish-_____
5. Use-_____
_____
_____

II. Enamel Reducers

A. 3 Basic Types

1. _____ or _____
2. _____ or _____
3. _____ or _____

B. _____ Reducer. For approx. 55°-85° F.

Notes-_____

Characteristics---Dries_____

More Notes-_____

C. _____ Reducer. For approx. 75°-95° F.

Notes-_____

Characteristics---Dries_____

More Notes-_____

D. _____ Reducer. For approx. 85°-100° F.

Notes-_____

Characteristics---Dries_____

More Notes-_____